

Dual-radiator RICH update: gemc simulation

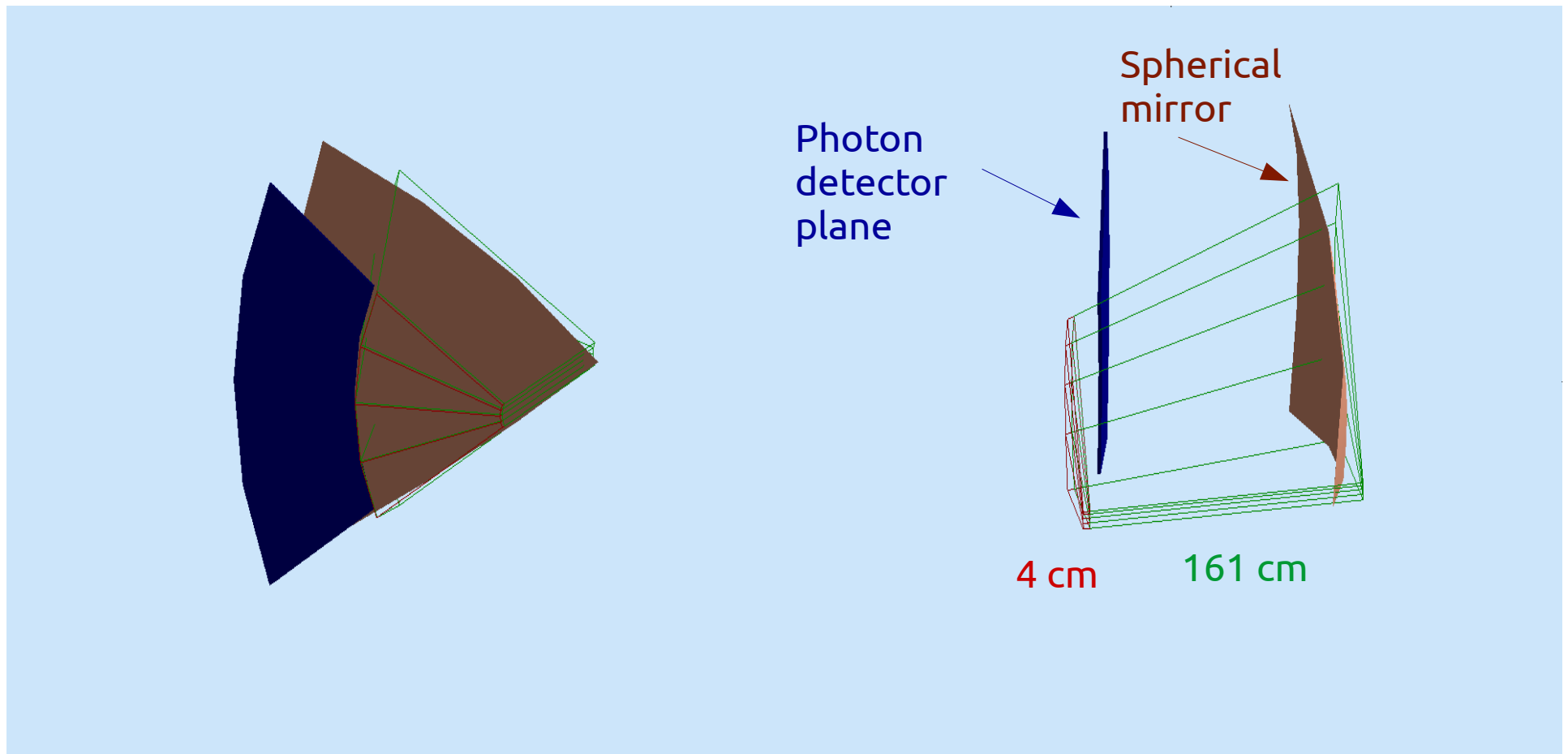
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For the EICPID RICH collaboration
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Towards a GEMC simulation

- A GEMC simulation of the dual-radiator RICH is under development (starting from the skeleton code provided by Zhiwen)
- Two configurations have been implemented:
 - Spherical mirror configuration
 - Mirror & Fresnel lens configuration
(The Fresnel from GEMC code of Liang and Hubert)
- Another configuration to be studied: two mirrors (double bounce)

Configuration 1: spherical mirror

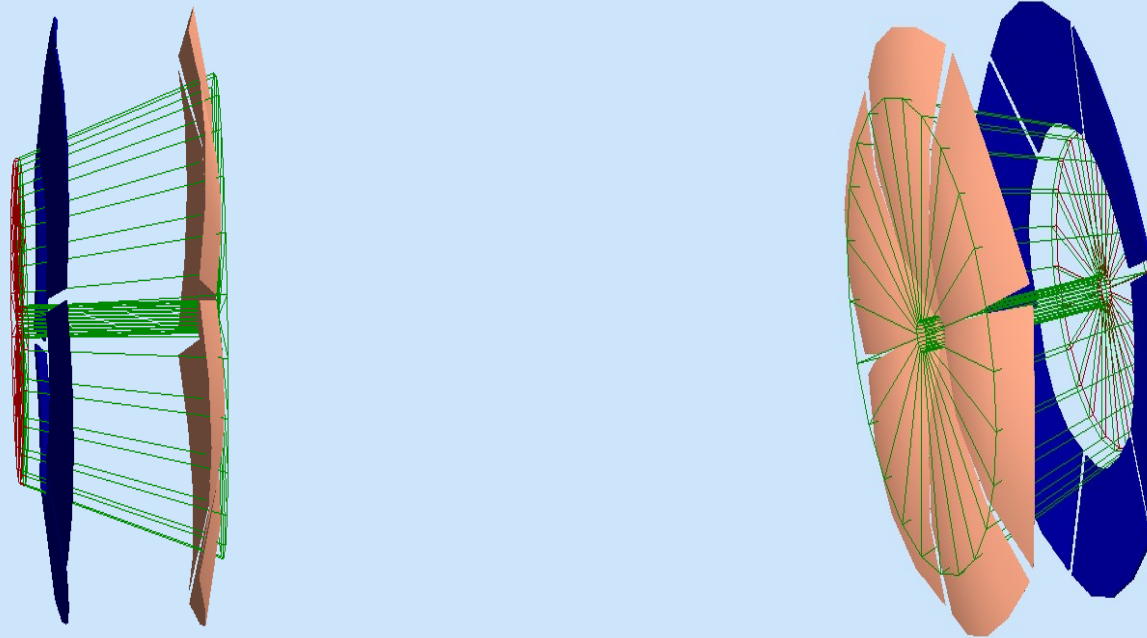
Single sector view



Radius of the two mirrors = 280 cm

Configuration 1: spherical mirror

4n view

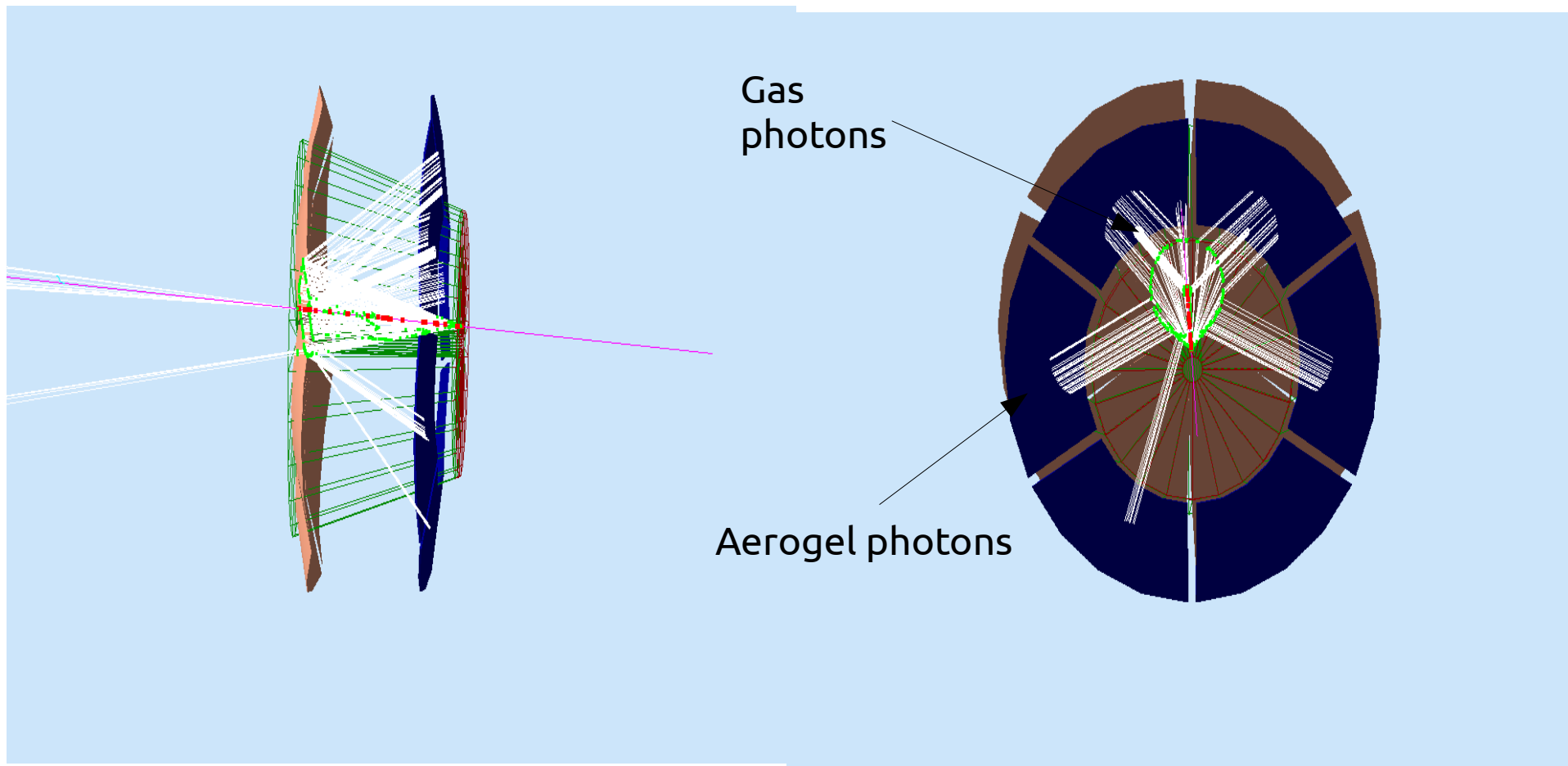


6 sectors arranged: phi coverage for 1 sector is 60 degrees;

Note: segmentation is parametrized in phi angle,
sectors are communicating (trivial to make them independent)

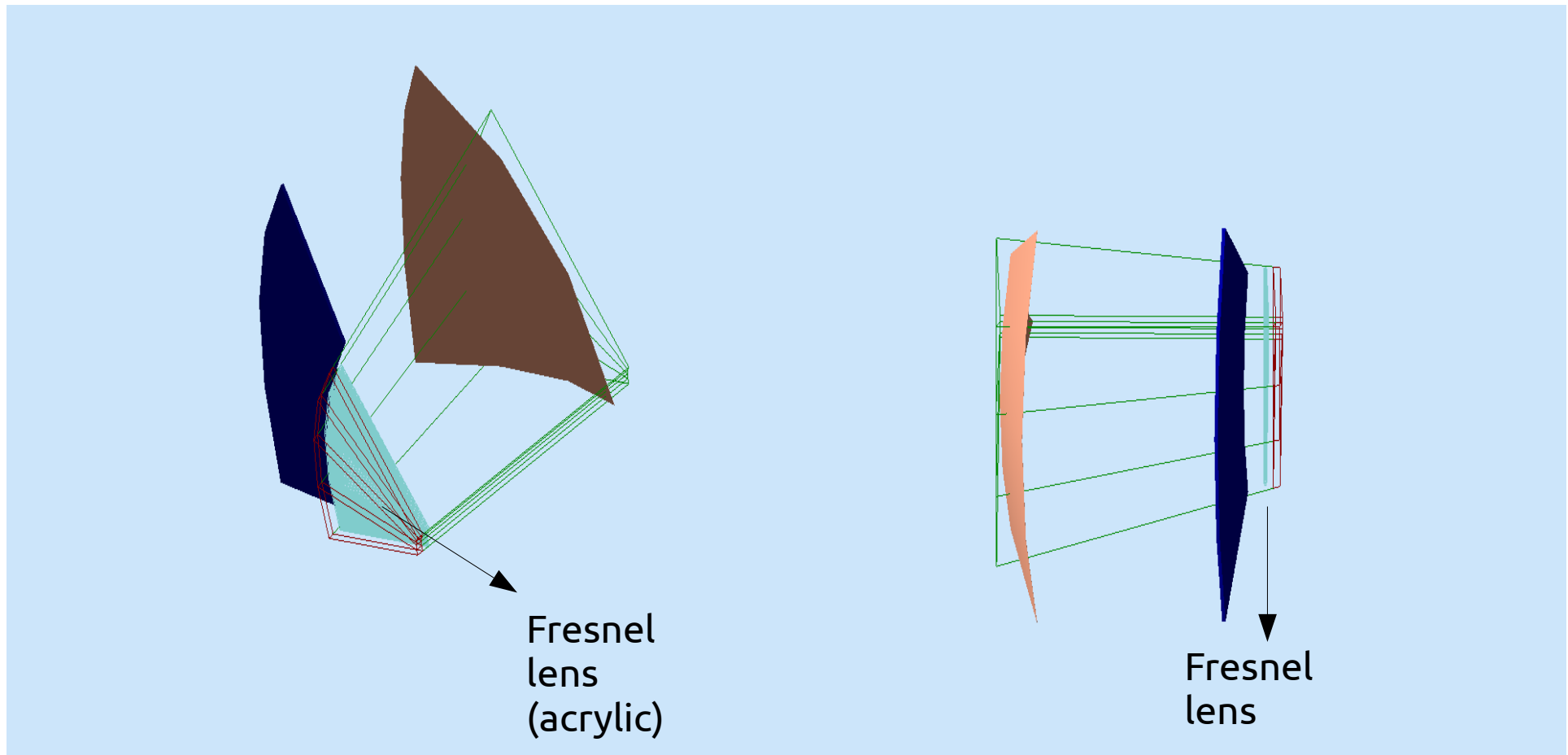
Configuration 1: spherical mirror

Event generation: in this example a pion of $p = 14 \text{ GeV}/c$



Configuration 2: spherical mirror & Fresnel lens

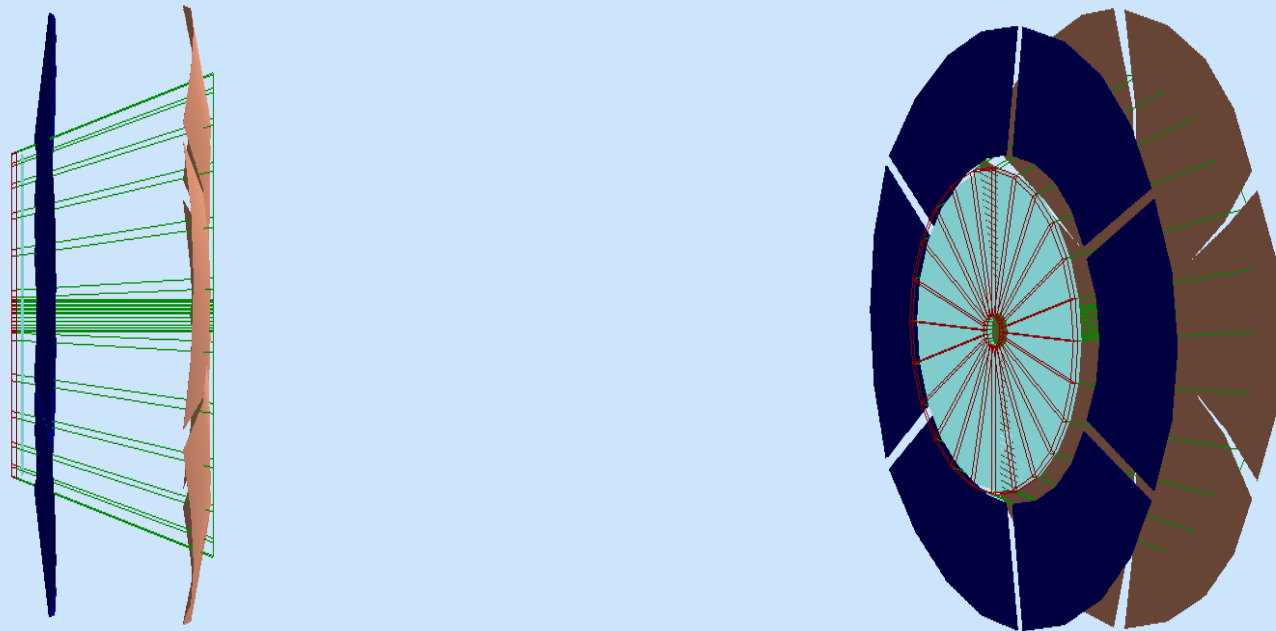
Single sector view



Radius of the two mirrors = 280 cm, focal length of the lens about 130 cm

Configuration 2: spherical mirror & Fresnel lens

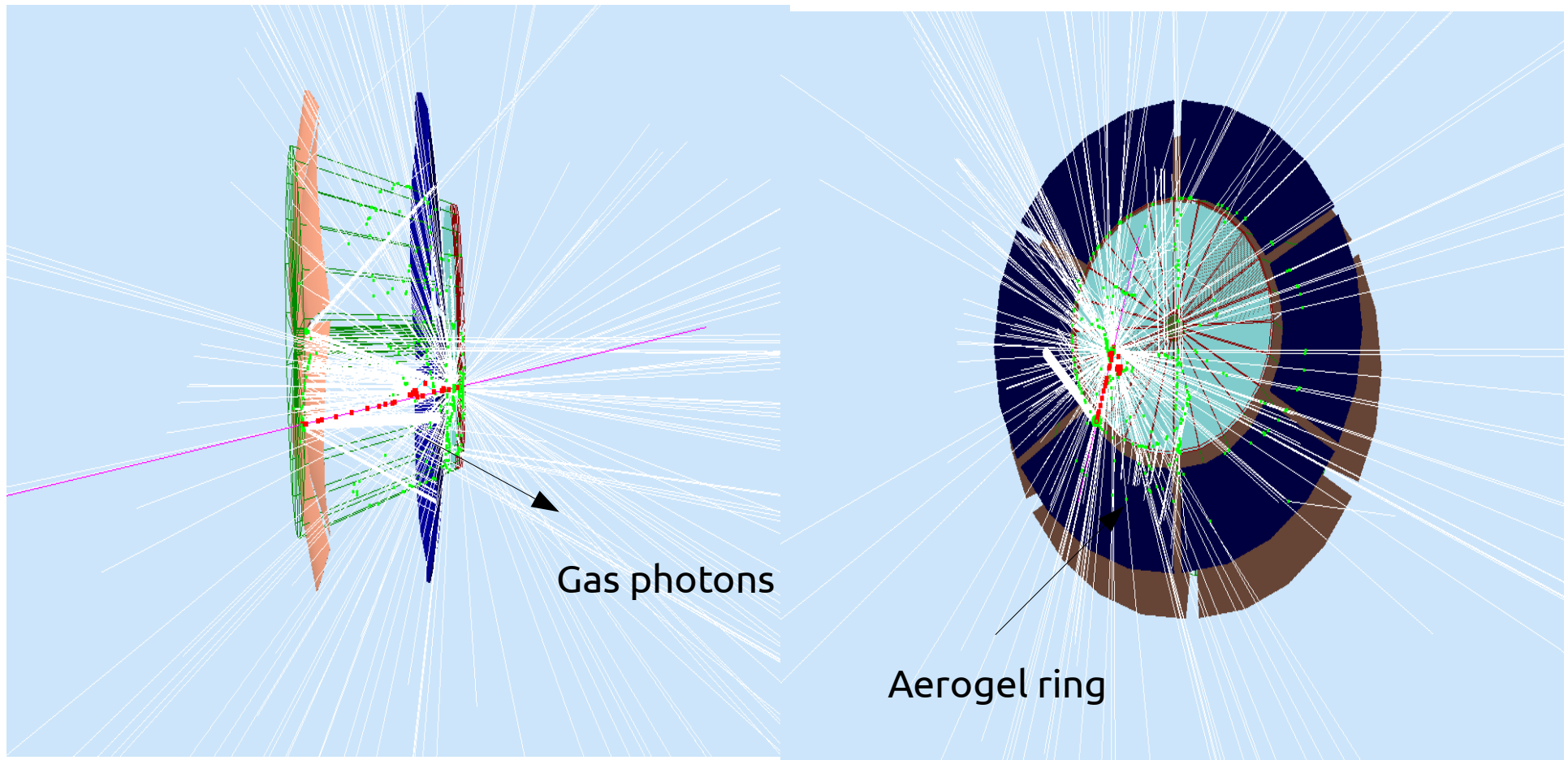
4n view



6 sectors arranged: phi coverage for 1 sector is 60 degrees

Configuration 2: spherical mirror & Fresnel lens

Event generation: in this example a pion of $p = 14 \text{ GeV}/c$



6 sectors arranged: ϕ coverage for 1 sector is 60 degrees

Note: only part of the Aerogel photons are transmitted

Comments and next developments

- Configurations 1 and 2 are under study in GEMC
- Next steps:
 - All the materials optical properties have to be set accurately
 - Extraction of the optical photons emission point, direction and energy; detection point and direction (hit position on mirror and lens?)
- Study of: the geometrical photon-collection efficiency
- Study of the optimal number of sectors in phi angle
- Double bounce configuration